Using long division in the world around us

▶ Long division in our world:

Example 1:

78 volunteers volunteered in the food bank, and the total number of working hours was 9,689 in a year. If each volunteer worked the same number of hours equally. How many hours did each volunteer work in a year?

Sol:

Number of working hours of each volunteer = 9,689 ÷ 78 = 124 hours

78 × 1 = 78
78 × 2 = 156
78 × 3 = 234
78 × 4 = 312
78 × 5 = 390
78 × 6 = 468

```
       124
78 | 9,689
     78
     188
     156
      329
      312
       17
```

9,689	÷	78	=	124	R 17
dividend		divisor		quotient	remainder

Example 2:

During a charity campaign for the Food Bank, 6,982 food packages were collected and placed in 93 food cartons, where each carton contains the same number of food packages. If the Food Bank wants to put the largest number of food packages in each carton, then how many packages will each carton contain?

Sol:

Number of packages will each carton contain = 6,982 ÷ 93 = 75 packages

93 × 1 = 93
93 × 2 = 186
93 × 3 = 279
93 × 4 = 372
93 × 5 = 465
93 × 6 = 558
93 × 7 = 651
93 × 8 = 744

```
        75
93 | 6,982
     651
      472
      465
        7
```

6,982	÷	93	=	75	R 7
dividend		divisor		quotient	remainder

(1) Answer each of the following:

1) Sara likes to take photos with her new camera; she took 427 photos in 15 days. **How many photos did she take in each day?**

....
....
....
....
....

2) A primary school is planning to a trip to the museum. There are 464 students. If each bus has 45 seats, **how many buses will be needed to fill all the students?**

....
....
....
....
....

3) A Zookeeper wants to give each monkey at the zoo an equal number of bananas. There 37 monkeys in the zoo and 567 bananas**, how many bananas does each monkey get? And how many are left over for him?**

....
....
....
....
....

4) Ahmed has 1,378 oranges and need to pack them up equally in 25 boxes. **How many oranges in each box?**

....
....
....
....
....

(2) Choose the correct answer:

1) If 384 ÷ 16 = 24 , then the dividend is ……..

a. 384 b. 16 c. 24 d. 0

2) If 40 ÷ 5 = 8 , then the remainder is ……..

a. 40 b. 5 c. 8 d. 0

3) If 29 ÷ 3 = 9 R2 , then the divisor is ……..

a. 29 b. 3 c. 9 d. 2

4) If Mona has 17 oranges and she wants to distribute them equally among 3 of her friends, how many oranges are left?

a. 17 b. 3 c. 5 d. 2

5) Salma made 47 cookies which she will distribute equally in tiny glass jars. If each jar is to contain 6 cookies each, how many cookies will not be placed in a jar?

a. 47 b. 5 c. 6 d. 7

6) Noha baked cookies for her classmates. If she can placed 12 cookies on a tray. How many trays will she need to prepare 276 cookies?

a. 12 b. 21 c. 22 d. 23

7) Ahmed has 120 crayons distribute them among 6 of his friends, how many crayons are left?

a. 0 b. 1 c. 2 d. 3

8) Which is the correct relation represents the following statement: (distribute 16 crayons equally among 4 students)

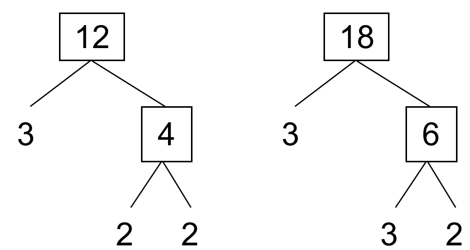
a. 16 × 4 b. 16 ÷ 4 c. 16 + 4 d. 16 – 4

Factorize the number into its prime factors

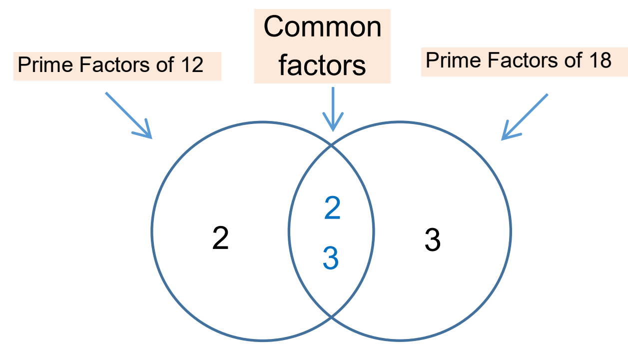
▶ Use Venn diagram to find (G.C.F) and (L.C.M):

EX: Find (G.C.F) and (L.C.M) of the numbers 12, 18 by using Venn diagram

Sol:



Venn diagram



12 = $2 \times 2 \times 3$

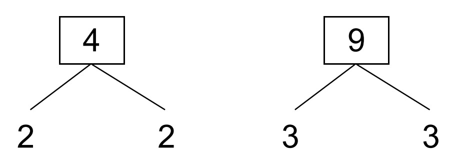
18 = $2 \times 3 \times 3$

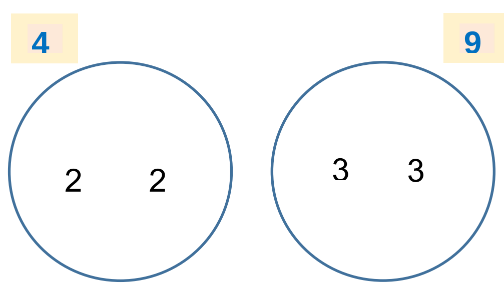
- From Venn diagram:

G.C.F = $2 \times 3 = 6$ (Multiply the common factors inside Venn diagram)

L.C.M = $2 \times 2 \times 3 \times 3 = 36$ (Multiply all the numbers inside Venn diagram)

EX: Find (G.C.F) and (L.C.M) of the numbers 4, 9 by using Venn diagram





4 = 2×2

9 = 3×3

- From Venn diagram:

G.C.F = 1

L.C.M = $2 \times 2 \times 3 \times 3 = 36$ (Multiply all the numbers inside Venn diagram)

▶ Notes:

- The common factor of all numbers is 1
- The greatest common factor (G.C.F) of any two prime numbers is 1
- The G.C.F of the two numbers which haven't any common prime factors is 1
- The common multiple of all numbers is 0
- The (L.C.M) of any two prime numbers is their product.

(1) Use Venn diagram to find (G.C.F) and (L.C.M) of each of the following:

18 and 24	20 and 30

36 and 42	5 and 7

6 and 15	10 and 35

(2) Choose the correct answer:

1) The common factor of all numbers is ……..

a. 0 b. 1 c. 2 d. 3

2) The G.C.F of any two prime numbers is ………..

a. 0 b. 1 c. 2 d. 3

3) The common multiple of all factors is ……….

a. 0 b. 1 c. 2 d. 3

4) The greatest common factor of 6 and 8 is ………

a. 1 b. 2 c. 3 d. 4

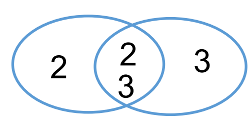
5) The greatest common factor of 2 and 3 is ………

a. 1 b. 2 c. 3 d. 6

6) From the following Venn diagram: the G.C.F of the representing numbers is ……….

a. 4 b. 9

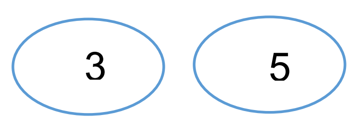
c. 6 d. 36



7) From the following Venn diagram: the L.C.M of the representing numbers is ……….

a. 1 b. 3

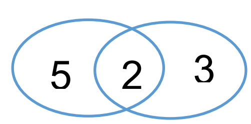
c. 5 d. 15



8) The following Venn diagram represents the prime factorization of two numbers which are ……

a. 3 and 5 b. 2 and 3

c. 2 and 5 d. 6 and 10



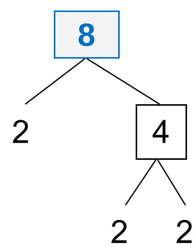
Writing numerical expression by using (G.C.F)

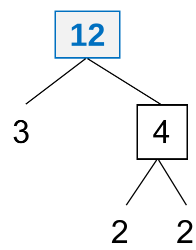
▶ Writing numerical expression by using (G.C.F):

EX: Sarah wanted to make a number of cartons to donate to charitable organizations; if she had 8 boxes of cheese and 12 bags of legumes, what is the largest number of cartons that can be made so that all cartons include the same number of items?

Sol:

1. Prime factorization

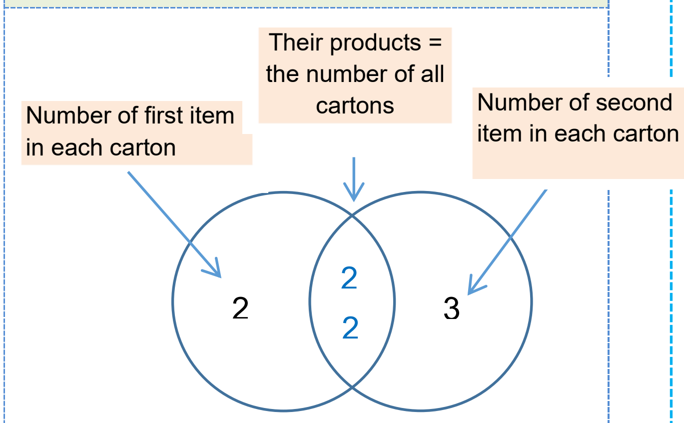




8 = 2 × 2 × 2
12 = 2 × 2 × 3

4 × (2 + 3)
G.C.F

2. Venn diagram



- **Using distributive property:**

4	×	(2	+	3)
Number of all cartons		Number of first item in each carton		Number of second item in each carton

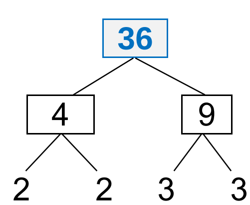
So, Numerical expression: (4 × 2) + (4 × 3)
The total number of items: 8 + 12 = 20
Means that: We have 4 cartons each carton has 2 boxes of cheese and 3 bags of legumes

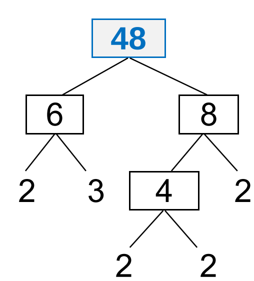
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EX: The students collected 36 boxes of cheese and 48 bags of legumes. What is the largest number of baskets of food that can be prepared without any food left?

Sol:

36 = 2 × 2 × 3 × 3
48 = 2 × 2 × 3 × 2 × 2
= 12 × (3 + 4)
= (12 × 3) + (12 + 4)





(1) Use the (G.C.F) to write the numerical expression of each of the following:

1) Samy has 6 oranges and 10 bananas. What is the largest number of bags that can be made so that all bags include the same number of items?

....

....

....

....

....

2) The students collected 20 boxes of cheese and 40 bags of legumes. What is the largest number of baskets of food that can be prepared without any food left?

....

....

....

....

....

3) Amir has 24 of red marbles and 36 of green marbles. What is the largest number of bags that can be made so that all bags include the same number of marbles?

....

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....

4) Karim 48 pencils and 18 crayons. What is the numerical expression of the greatest number of sets that can be made so that all sets include the same number of items?

....

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....

Exercises 3: *Writing numerical expression by using (G.C.F)*

(2) Choose the correct answer:

1) The following expression represents the greatest number of bags can be made from apples and bananas respectively: (12 × 6) + (12 × 4)
, then the number of all bags is …………

a. 12 **b.** 4 **c.** 6 **d.** 120

2) The following expression represents the greatest number of trays can be made from cookies and croissant respectively: (3 × 4) + (3 × 7)
, then the number of cookies in each tray is …………

a. 3 **b.** 4 **c.** 7 **d.** 12

3) The following expression represents the greatest number of bags can be made from potatoes and carrot respectively: (6 × 6) + (6 × 3)
, then the total number of carrots in all bags is …………

a. 6 **b.** 36 **c.** 18 **d.** 9

4) The following expression represents the greatest number of bags can be made of red and green marbles respectively: (5 × 2) + (5 × 4)
, then the total number of marbles in all bags is …………

a. 10 **b.** 20 **c.** 30 **d.** 40

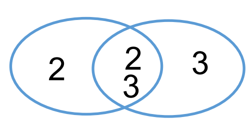
5) The following expression represents the greatest number of baskets water and juice bottles respectively: (10 × 3) + (10 × 5)
, then the number of all bottles in each basket is …………

a. 10 **b.** 8 **c.** 15 **d.** 80

6) The following expression represents the greatest number of bags can be made from mangos and bananas respectively, then the number of all bags is …………

a. 4 **b.** 9

c. 6 **d.** 36



► Adding and subtracting fractions with like denominators:

Ahmed has 3 equal bags of oranges. He wanted to taste the fruit inside each bag to make sure of its quality, the following table represents that:

			The sum
The whole	$\frac{6}{6}$	$\frac{6}{6}$	$\frac{6}{6}+\frac{6}{6}=\frac{12}{6}=2$
What Ahmed ate	$\frac{3}{6}$	$\frac{4}{6}$	$\frac{3}{6}+\frac{4}{6}=\frac{7}{6}=1\frac{1}{6}$
remainder	– – – = –	– – – = –	– – –

- **Generally:** when we add or subtract any two fractions with like denominators, we add or subtract the numerators with the same denominators.

EX: – + – = – *EX:* – + – = – –

EX: – – – = – *EX:* – – – = –

► Adding and subtracting fractions with unlike denominators:

Ahmed wanted to make a meal of oranges and pears by use half bag of oranges and – of bag of pears, the following table represents that:

			The L.C.M of denominators	The sum
The whole	–	–	6 = 2 × 3 4 = 2 × 2 L.C.M = 2 × 3 × 2 = 12	— —
What Ahmed ate	–	–		— — —
remainder	– – – = –	– – – = –		— — — —

- **Generally:** when we add or subtract any two fractions with unlike denominators, we change the unlike denominators into like denominators by using the L.C.M of two denominators

Exercises 4: *factorize the least common multiple*

(1) Find the result:

— + — = ...	— + — = ...	5 — + — = ...
— + — = ...	— + — = ...	— + 1 — = ...
— + — = ...	— + — = ...	+ — = ...
— - — = ...	— - 1 — = ...	- — = ...
— - — = ...	— - — = ...	- — = ...
— - — = ...	— - — = ...	- — = ...
— + — = ...	— + — = ...	— + 1 — = ...
— + — = ...	— + — = ...	— + — = ...
— + — = ...	— + — = ...	— + — = ...
— - — = ...	— - — = ...	— - — = ...
— - — = ...	— - — = ...	— - — = ...
— - — = ...	— - — = ...	— - — = ...

Exercises 4: *factorize the least common multiple*

(2) Choose the correct answer:

1) – –– = …………

a. — b. — c. — d. –

2) The equivalent fraction of — is ………….

a. – b. – c. – d. –

3) – + – = …………

a. — b. — c. — d. 4

4) – + —— =

a. – b. – c. – d. –

(3) Answer the following:

1) Salma bought 3 – kg of tomato, and 1 – kg of onion. **How much vegetables did she buy?**

……………………………………………………………………………………

……………………………………………………………………………………

2) Basma walked 2 – km on Sunday, and 1 – km on Monday. **What distance did she walk in all?**

……………………………………………………………………………………

……………………………………………………………………………………

3) Ali bought a bottle of juice contains 1 – liters of orange juice. He drank – liter of juice. **How much of juice is left in the bottle?**

……………………………………………………………………………………

……………………………………………………………………………………

1
Lesson

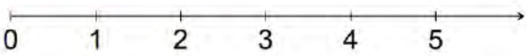
Integer numbers

▶ Integer numbers:

- **Counting numbers:** 1, 2, 3, 4, ….   (counting numbers)



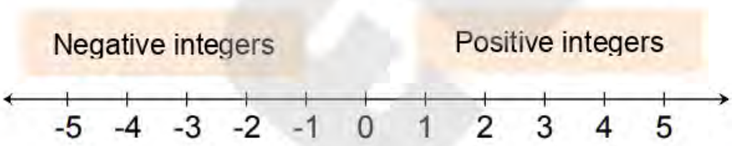
- **Natural numbers:** 0, 1, 2, 3, 4, … (Zero and counting numbers)



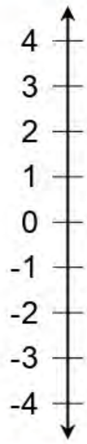
- **Integer numbers:** …… , -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, …….
  Negative integers and zero and positive integers
  Or Negative integers and zero and counting numbers
  Or Negative integers and natural numbers

▶ Representing integers on number line:

1. Horizontal number line:



2. Vertical number line:



▶ Notes:

- Integer numbers are infinite
- The smallest positive integers is 1
- the greatest negative integers is -1
- the number zero neither negative nor positive number
- zero is smaller than any positive integer number
- zero is greater than any negative integer number

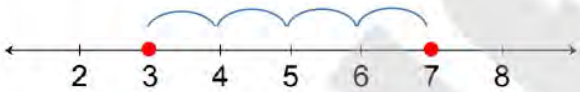
▸ Life situations of integers:

EX: **Write an integer to represent each situation:**

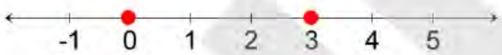
1. The orange juice freezes at 6 C° below zero **- 6**
2. Ahmed walked 5 steps forward **5**
3. A building is 12 m high **12**
4. Amir diving 7 m below sea level **- 7**

▸ Find the distance between two integer numbers on the number line:

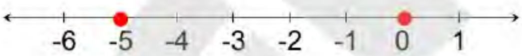
EX: **Find the distance between each two numbers on the number line:**



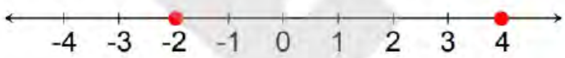
4 units



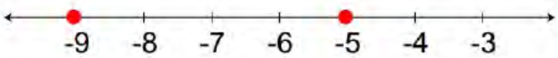
3 units



5 units



6 units



4 units

▸ Notes:

- The distance between any two numbers is always positive.
- We can write positive numbers by two ways:

  EX: 2 Or + 2

Exercises 1: Integer numbers

(1) Write an integer which represents each of the following situations:

1) A temperature is 5 degree below 0 C° ....
2) A profit of 23 pounds ....
3) He is diving 6 m below sea level ....
4) A decrease of 4 kg of weight ....
5) Ahmed walked 4 steps forward ....
6) 9 m below ground ....
7) A building is 12 m high ....
8) Nada walked 5 steps backward ....
9) An Increase of 7 kg of weight ....
10) A loss of 60 pounds ....

(2) Choose the correct answer:

1) The number 0 is a .... number.
   a. Counting   b. Positive   c. Negative   d. Natural

2) The number -3 is .... number.
   a. Counting   b. Natural   c. Integer   d. positive

3) Which of the following numbers is a counting number?
   a. -5   b. 2   c. -2   d. 0

4) The integer numbers consists of negative numbers and ..... numbers.
   a. Positive   b. Counting   c. Natural   d. Otherwise

5) The smallest positive integer is ....
   a. 0   b. 1   c. -1   d. 2

6) The greatest negative integer is ....

a. 0 **b.** 1 **c.** -1 **d.** 2

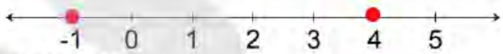
7) Which integer represents the following:
A plane flying at an altitude 425 meters above ground level

a. + 425 **b.** - 425 **c.** 0 **d.** Otherwise

8) Which integer represents the following:
A submarine at a depth of 20 meters below sea level

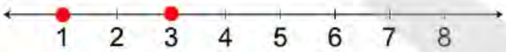
a. 2 **b.** 20 **c.** - 20 **d.** 2

9) From the following number line:
The distance between the two numbers is ....



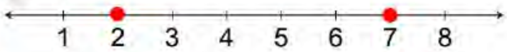
a. 3 **b.** 4 **c.** 5 **d.** 6

10) Which of the following number lines represent the distance 3?

a.


b.


c.


d.


11) An integer included between - 2 and 3 is ....

a. 4 **b.** - 3 **c.** - 4 **d.** - 1

12) The integer which comes just before the number – 5 is ....

a. - 4 **b.** - 6 **c.** 4 **d.** 6

13) The integer which comes just next the number 5 is ....

a. - 4 **b.** - 6 **c.** 4 **d.** 6

14) The number of integers between - 2 and 2 is ....

a. 2 **b.** 3 **c.** 4 **d.** 5

15) The number of integers on the number line is ....

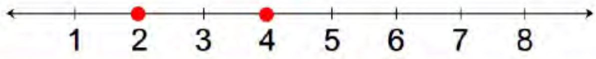
a. 0 **b.** 1 **c.** 100 **d.** Infinite number

2 Lesson

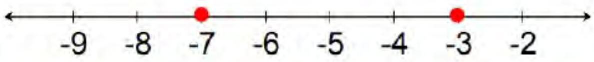
Comparing Integer numbers

▶ Using number line to compare integer numbers:

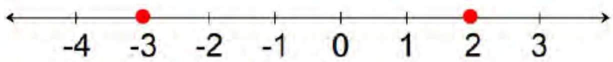
EX: **Use the number line to compare each of the following:**



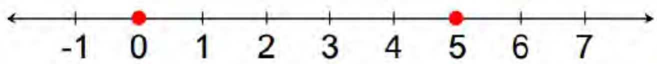
4 is greater than **2**



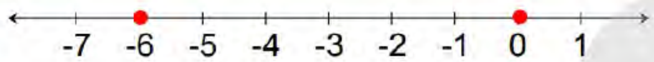
- 3 is greater than **- 7**



2 is greater than **- 3**



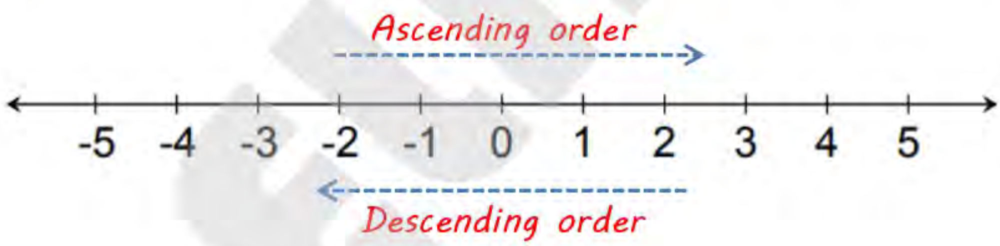
5 is greater than **0**



0 is greater than **- 6**

Generally:

The numbers increase from left to right and decrease from right to left.



▶ Notes:

- The numbers are in ascending order (increase) from left to right.
- The numbers are in descending order (decrease) from right to left.
- Any positive integer is greater than any negative integers.
- Zero is smaller than any positive integer.
- Zero is greater than any negative integer.
- When comparing any two integer numbers, the number to the right of the other is the largest.



b is greater than **a**

▶ Using symbols to compare integer numbers:

EX: **Use the suitable symbol from > , < to compare each of the following:**

a.	- 3	☐	- 7	**d.**	- 9	☐	2
b.	0	☐	8	**e.**	0	☐	- 6
c.	4	☐	3	**f.**	- 2	☐	2

Sol:

a. > **b. <** **c. >** **d. <** **e. >** **f. <**

▶ Opposite numbers (inverses) and additive inverse:

- **The opposite numbers (inverses):** are the numbers when placed on a number line having the same distance away from 0 but in the opposite directions.



- **Additive inverse:** the additive inverse of any number is the opposite number on the number line.

  EX: additive inverse of 3 is - 3

  EX: additive inverse of - 5 is 5

▶ Notes:

- The number and its additive inverse have the same distance away from 0 but in the opposite direction.
- For any integer a there is additive inverse - a
- The additive inverse of zero is zero.
- The sum of any two opposite numbers is 0.

Exercises 2: Comparing integer numbers

(1) Compare by using > , < or = :

1)	3		7	6)	5		0	11)	0		- 1
2)	0		- 5	7)	12		- 7	12)	- 4		- 3
3)	- 3		- 8	8)	- 9		2	13)	- 8		4
4)	- 9		0	9)	- 10		- 1	14)	1		0
5)	6		- 6	10)	0		- 15	15)	8		- 2

(2) Choose the correct answer:

1) The additive inverse of – 5 is ……..
a. 5 b. - 5 c. 0 d. Otherwise

2) The additive inverse of zero is ………..
a. 1 b. 0 c. - 1 d. Otherwise

3) Which of the following are opposite numbers?
a. 3 , 3 b. - 3 , - 3 c. 3 , - 3 d. 1 , 10

4) The sum of any two opposite numbers is ………
a. 0 b. 1 c. 2 d. - 1

5) Which of the following is the correct statement?
a. 5 < 2 b. - 2 < - 5 c. 2 < - 5 d. - 2 > - 5

6) Which of the following is the correct statement?



a. a > b b. a < b c. b < a d. a = b

7) Which of the following represents an ascending order?
a. - 2, - 4 , 3, 5 b. 3, 5, - 2, - 4
c. - 4, - 2 , 3, 5 d. - 2, - 3 , 4, 5

3 Lesson — Set of rational numbers

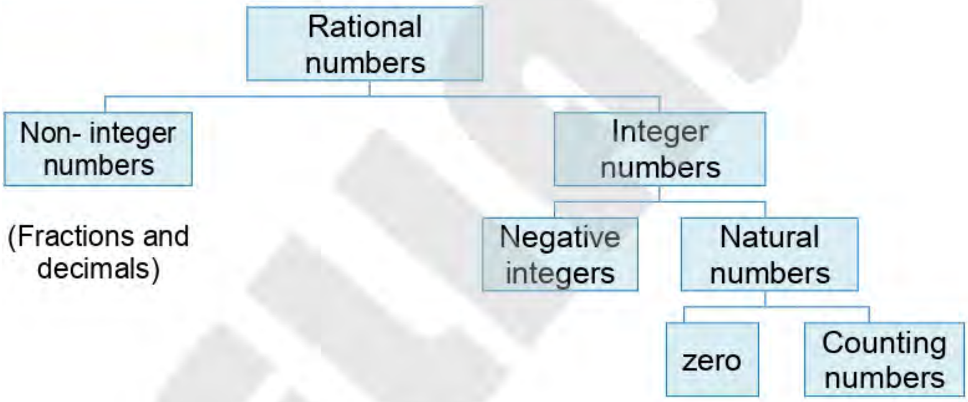
▶ Rational numbers:

- **Rational numbers:** ...... , -2, ... ,-1, ... , 0, ... , 1, ... , 2, ...
  integer numbers and all numbers between them (fractions, decimals, ...)
  Or negative rational and zero and positive rational

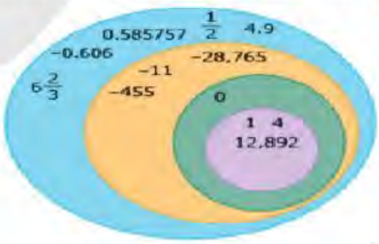
- **Forms of rational number:**

	Whole number	Fraction	Decimal	Mixed number	Other
EX:	4, -6	$\frac{3}{4}$, $-\frac{1}{2}$	0.7 , 2.25	$3\frac{1}{2}$, $-2\frac{1}{4}$	.....

▶ Sets of numbers:



- **Representing sets of numbers on Venn-diagram:**



▶ **Notes:**

- Set of counting, natural and integer numbers are subset of rational numbers.
- We use belong to and not belong to to determine the relation between a number and set.

  EX: 3 is belong to set of natural numbers
- We use subset of and not subset to determine the relation between set and set

  EX: set of Integer numbers is subset of set of natural numbers

▸ Writing a rational number as a fraction (in the form of $\frac{a}{b}$):

- Any rational number can be writing in the form of fraction $\frac{a}{b}$.

EX: **Write each of the following in the form of fraction $\frac{a}{b}$:**

a. 4 = ………. **c.** 0.75 = ……….

b. - 1.5 = ………. **d.** $2\frac{1}{3}$ = ……….

Sol:

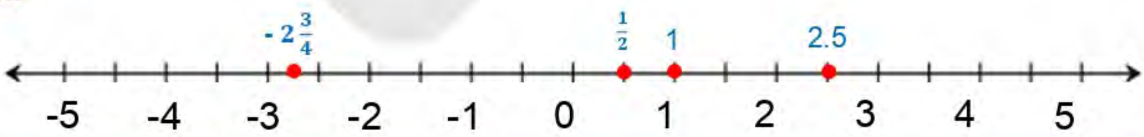
a. $\frac{4}{1}$ **b.** $-\frac{15}{10}$ **c.** $\frac{75}{100}$ **d.** $\frac{7}{3}$

▸ Locate rational numbers on the number line:

EX: **Represent each of the following numbers on the number line:**

1 , $\frac{1}{2}$, 2.5 , $-2\frac{3}{4}$

Sol:



Exercises 3: Set of rational numbers

(1) Put ✓ under the suitable set:

Number	Set of counting	Set of natural	Set of integer	Set of rational
0.585757				
4				
- 455				
0				
- 0.606				
$-6\,\frac{2}{3}$				
- 11				
- 28,765				
$\frac{1}{2}$				
1				
12,892				
4.9				

(2) Write each of the following in the form of fraction $\frac{a}{b}$:

1) 5 = ...
2) $2\,\frac{1}{3}$ = ...
3) - 28 = ...
4) - 1 = ...
5) - 2.15 = ...
6) $-3\,\frac{2}{5}$ = ...
7) - 6 = ...
8) 0 = ...
9) 0.45 = ...
10) -15 = ...
11) 0.625 = ...
12) $-4\,\frac{1}{2}$ = ...
13) - 0.3 = ...
14) $1\,\frac{3}{4}$ = ...
15) 2.7 = ...

Exercises 3: *Set of rational numbers*

(3) Choose the correct answer:

1) 32 ………… the set of counting numbers

a. Belong to b. Not belong to c. Subset of d. Not subset of

2) the set of integer numbers ………… the set of rational numbers

a. Belong to b. Not belong to c. Subset of d. Not subset of

3) the set of rational numbers ………… the set of natural numbers

a. Belong to b. Not belong to c. Subset of d. Not subset of

4) $-\frac{3}{7}$ ………… the set of integer numbers

a. Belong to b. Not belong to c. Subset of d. Not subset of

5) The additive inverse of the number 0.5 is ………

a. $-\frac{5}{10}$ b. $\frac{5}{10}$ c. 5 d. - 5

6) The number $\frac{2}{5}$ is belong to the set of the ………… numbers.

a. Natural b. Counting c. Integer d. rational

7) The number $\frac{6}{3}$ is belong to the set of the ………… numbers.

a. Natural b. Integer c. Rational d. All of the previous

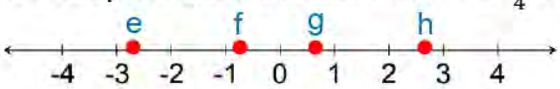
8) Which of the following is the smallest rational number?

a. - 6 b. $-4\frac{3}{5}$ c. - 2.35 d. 0

9) Which of the following is equivalent to the number - 2.7 ?

a. $-2\frac{7}{10}$ b. $-2\frac{7}{100}$ c. $-\frac{7}{10}$ d. $\frac{7}{10}$

10) The point which represents the number $-2\frac{3}{4}$ on the following number line is ……



a. e b. f c. g d. h

Comparing and ordering rational numbers

▶ Comparing rational numbers:

- To compare any two rational numbers put them in the same form if you need that, and then compare.

EX: Compare each of the following by using > , < or =:

a. $\frac{2}{9}$ ☐ $\frac{1}{9}$ b. -5 ☐ $4\frac{3}{5}$

c. $-\frac{1}{2}$ ☐ $-\frac{3}{4}$ d. 3.75 ☐ 3.76

Sol: a. > b. < c. > d. <

▶ Ordering rational numbers:

- **Ascending order:** from smallest to greatest.
- **Descending order:** from greatest to smallest.

EX: Arrange the following numbers in ascending order:

2.1 1.4 $-3\frac{1}{4}$ $-1\frac{7}{8}$ $-2\frac{1}{2}$

The ascending order is: $-3\frac{1}{4}$, $-2\frac{1}{2}$, $-1\frac{7}{8}$, 1.4 , 2.1

▶ Find a rational number between a pair of numbers:

EX: Write a rational number lies between each of the following pairs of numbers:

1) 3.5 and 3.6 ⇒ 3.50 , 3.60 The number is: 3.51

2) $\frac{1}{3}$ and $\frac{2}{3}$ ⇒ $\frac{1\times2}{3\times2}$, $\frac{2\times2}{3\times2}$ $\frac{2}{6}$, $\frac{4}{6}$ The number is: $\frac{3}{6}$

3) $-\frac{1}{2}$ and $-\frac{3}{5}$ ⇒ $-\frac{1\times5}{2\times5}$, $-\frac{3\times2}{5\times2}$ ⇒ $-\frac{5}{10}$, $-\frac{6}{10}$ ⇒ $-\frac{5\times2}{10\times2}$, $-\frac{6\times2}{10\times2}$ ⇒ $-\frac{10}{20}$, $-\frac{12}{20}$

The number is: $-\frac{11}{20}$

Exercises 4: Comparing and ordering rational numbers

(1) Compare by using > , < or = :

1)	$\frac{2}{5}$		$\frac{4}{5}$	6)	$3\frac{1}{4}$		0	11)	$-3\frac{1}{2}$		- 3.6
2)	$-\frac{3}{7}$		$-\frac{5}{7}$	7)	6		0.65	12)	0.9		- 0.9
3)	0		- 0.12	8)	- 0.71		- 0.72	13)	$2\frac{2}{3}$		$2\frac{4}{5}$
4)	0.5		$\frac{1}{2}$	9)	$\frac{36}{10}$		$\frac{36}{100}$	14)	6.9		- 10
5)	2		$-5\frac{1}{2}$	10)	$\frac{4}{5}$		$1\frac{1}{2}$	15)	3.5		$-4\frac{3}{7}$

(2) Arrange the following numbers in ascending order:

1) 0.3 , - 1.9 , 3.5 , 0 , - 0.5 ..... , ... , ... , ... , ...

2) $-1\frac{1}{3}$, $2\frac{1}{2}$, $-4\frac{1}{2}$, $-\frac{3}{4}$, $1\frac{1}{2}$ ..... , ... , ... , ... , ...

3) 6.5 , $3\frac{1}{2}$, $-\frac{5}{7}$, - 1 , - 3.5 ..... , ... , ... , ... , ...

(3) Arrange the following numbers in descending order:

1) - 5 , 2.4 , - 7.8 , 1 , 0 ..... , ... , ... , ... , ...

2) $3\frac{2}{5}$, $-2\frac{4}{5}$, $-7\frac{1}{3}$, $-2\frac{3}{5}$, $1\frac{5}{6}$ ..... , ... , ... , ... , ...

3) 2.9 , - 2.5 , 3.7 , - 8 , - 5 ..... , ... , ... , ... , ...

(4) Write a rational number lies between each of the following pairs of numbers:

1) $\frac{2}{3}$ and $\frac{4}{5}$ ....

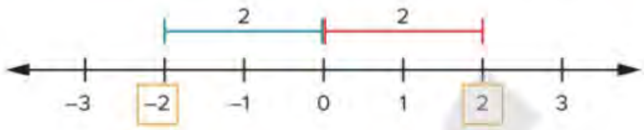
2) 0.4 and 0.5 ....

3) $-1\frac{1}{4}$ and $-1\frac{2}{4}$ ....

• The absolute value
• Comparing absolute values

▶ Absolute value:

- **The absolute value of a number:**
  Is the distance between this number and zero on the number line.
- The absolute value is always positive or equal zero.
- The absolute value of any number X denoted by I X I



I -2 I = 2 , I 2 I = 2

▶ **Notes:**

- The absolute value of zero is zero.
- The opposite numbers have the same absolute value.
- Any number and its additive inverse have the same absolute value.
- Whenever the absolute value is smaller, whenever the number is closer to zero.
- Whenever the absolute value is greater, whenever the number is farther away zero.

▶ Comparing absolute values:

EX: **Compare each of the following by using > , < or =:**

a.	I -3 I	☐	I -4 I	**d.**	-7.9	☐	I -8.2 I
b.	I -1.4 I	☐	-1.4	**e.**	$\left\|-\frac{35}{6}\right\|$	☐	$5\frac{5}{6}$
c.	$\left\|-9\frac{3}{4}\right\|$	☐	$\left\|9\frac{3}{5}\right\|$	**f.**	2.7	☐	I -2.71 I

Sol:

a. < **b.** > **c.** > **d.** < **e.** = **f.** <

Exercises 5,6: *The absolute value*

(1) Complete:

1) $|3| =$ ....

2) $|-6| =$ ....

3) $|\frac{5}{9}| =$ ....

4) $|-0.75| =$ ....

5) $|5\frac{1}{4}| =$ ....

6) $|0| =$ ....

7) $-|3.5| =$ ....

8) $|-7\frac{1}{2}| =$ ....

9) $|4.5| =$ ....

10) $-|-10| =$ ....

11) $-|17| =$ ....

12) $|-1| =$ ....

(2) Compare by using > , < or = :

1)	$|-6.2|$		-8.9
2)	$5\frac{3}{4}$		$|-\frac{23}{4}|$
3)	$|-3\frac{3}{4}|$		$|3\frac{3}{5}|$
4)	$|-5.72|$		5.7
5)	$|-1.9|$		-1.9
6)	$|0|$		0
7)	$|-8.5|$		$|-6.5|$
8)	$-|13|$		13
9)	$|10|$		$|-10|$
10)	$|-2\frac{3}{4}|$		$\frac{15}{4}$

(3) Arrange the following numbers in ascending order:

1) 2.8 , -1.9 , $|-6.5|$, 0 , -0.5

The order is: .... , ... , ... , ... , ...

2) $-2\frac{4}{5}$, $|-2\frac{1}{2}|$, $-4\frac{1}{2}$, $|-\frac{4}{9}|$, $1\frac{3}{7}$

The order is: .... , ... , ... , ... , ...

3) 7.5 , $-2\frac{1}{3}$, $-\frac{8}{9}$, $|-1|$, $|-3.5|$

The order is: .... , ... , ... , ... , ...

(4) Choose the correct answer:

1) $|-10| =$ ....

a. 0 b. 1 c. 10 d. - 10

2) $|0| =$ ....

a. 0 b. 1 c. 10 d. - 10

3) The absolute values of any two opposite numbers are ....

a. Negative b. Equal c. -1 d. 1

4) If $|x| = 7$, then the value of x = ...

a. 7 only b. - 7 only c. 7 or - 7 d. Otherwise

5) $|-3.75|$ 3.75

a. $>$ b. $<$ c. $=$ d. Otherwise

6) 0 .... $-|-8|$

a. $>$ b. $<$ c. $=$ d. Otherwise

7) The additive inverse of 6 .... $|-5|$

a. $>$ b. $<$ c. $=$ d. Otherwise

8) $|-5| >$ ....

a. $|5|$ b. $|6|$ c. 9 d. - 5

9) The negative number which has absolute value more than 16 is ....

a. - 14 b. - 15 c. - 16 d. - 17

10) Whenever the number is farther away zero, whenever the absolute value is ....

a. Negative b. Smaller c. Greater d. Otherwise